PATENT ABSTRACTS OF JAPAN

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(21)Application number : **04-009155** (71)Applicant : **HITACHI CHEM CO LTD**
(22)Date of filing : **22.01.1992** (72)Inventor : **OTA KOJIRO**
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(54) ELECTRODE PLATE FOR PLASMA ETCHING DEVICE

(57)Abstract:
PURPOSE: To get a plasma etching device which withstands long-term use and besides has wide use property without polluting a silicon wafer by using silicon carbide silicified of vitreous carbon as an electrode plate.
CONSTITUTION: Many holes 0.8mm in diameter are opened at intervals of 3mm in a carbon plate 1.5g/cm3 in density, 200mm in diameter, and 3mm in length, and then it is put in a silicifying furnace, and is heated to 1700°C, thus it is silicified while passing SiO gas for three hours. The thickness of the silicified electrode plate obtained is 1.5mm, and it silicifies most of vitreous carbon, and the shrinkage area in diametrical direction is 0.09mm, and the density is 2.5g/cm3, and the flexural strength is 2k/mm2. When this electrode plate is installed in a plasma etching device, and the plasma etching of a silicon wafer is executed while passing CF4 gas, the silicon wafer is not polluted, and extremely equal etching can be performed. What is more, corrosion is hardly found in the electrode plate.

CLAIMS

[Claim(s)]
[Claim 1] The electrode plate for plasma etching systems which consists of silicification carbon material which silicified the plate of glassy carbon.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the electrode plate for plasma etching systems.
[0002]
[Description of the Prior Art] Gas phase etching (dry etching) in which the etching processing in the production process of IC or LSI has the descriptions, like the need does not have the adhesion of a resist especially in recent years although liquid phase etching was mainly performed conventionally is coming to be performed. Plasma

etching which can avoid pervasion of a photoresist and can raise precision especially, i.e., etching by enclosing gas with a coil and generating the plasma in high frequency, has come to be performed. In this plasma etching, an electrode plate is formed in homogeneity for the purpose of supplying reactant gas on the surface of a silicon wafer. As this electrode plate, the high grade aluminum which performed alumite processing, a graphite, quartz glass, etc. have been conventionally used for stainless steel and a front face.

[0003]

[Problem(s) to be Solved by the Invention] However, the plasma is easy to be corroded and stainless steel and the high grade aluminum which performed alumite processing to the front face have the fault which is easy to pollute a silicon wafer, and since a graphite is inferior to the corrosion resistance over the plasma, its life is short, and it does not bear it at prolonged use. Furthermore, quartz glass is difficult to process it, and it is comparatively expensive, and it has the fault to which use is limited by the class of corrosive gas. Without polluting a silicon wafer, this invention is equal to prolonged use, and aims at offering the electrode plate for plasma etching systems which moreover has versatility.

[0004]

[Means for Solving the Problem] This invention relates to the electrode plate for plasma etching systems (it is hereafter called an electrode plate) which consists of silicification carbon material which silicified the plate of glassy carbon.

[0005] In this invention, the reason using the silicification carbon material which silicified glassy carbon as an electrode plate is that it prevents very well the dirt of the silicon wafer by the ashes ghost produced by etching processing. Moreover, since the electrode plate of this invention is used also in order to prepare many holes and also to hold other components, average bending strength is two or more [1 kgf/mm], and a certain thing has a consistency desirable [a plate] three or more 2.4 g/cm. If a consistency is small, a SiC crystal grain child's association will become weak, and bending strength will fall. Moreover, as for an electrode plate, what silicified 70% or more of vitrified charcoal blank overall thickness Mino is desirable.

[0006]

[Example] Next, the example of this invention is explained. To the plate of glassy carbon with a diameter [3 and the diameter of 200mm] of with a consistency of 1.50g [/cm], and a thickness of 3mm, after preparing the hole of a large number with a diameter of 0.8mm at intervals of 3mm, it put into the silicification furnace, and it heated at 1700 degrees C, and silicified through [for 3 hours] SiO gas. The silicification depth of the obtained electrode plate silicified most glassy carbon by 1.5mm, and, for the contraction cost of the diameter direction, 0.09mm and a consistency were [2.5 g/cm3 and bending strength] 2 2 kgf(s)/mm.

[0007] When the plasma etching system was equipped with this electrode plate and plasma-etching processing of a silicon wafer was carried out through CF4 gas, it was not polluted but the silicon wafer was able to perform very uniform etching processing. In addition, as for the electrode plate, corrosion was hardly accepted.

[0008]

[Effect of the Invention] The electrode plate of this invention is good, polluting a silicon wafer twists it and the corrosion resistance over the plasma is extremely excellent.

TECHNICAL FIELD

[Industrial Application] This invention relates to the electrode plate for plasma etching systems.

PRIOR ART

[Description of the Prior Art] Gas phase etching (dry etching) in which the etching processing in the production process of IC or LSI has the descriptions, like the need does not have the adhesion of a resist especially in recent years although liquid phase etching was mainly performed conventionally is coming to be performed. Plasma etching which can avoid pervasion of a photoresist and can raise precision especially, i.e., etching by enclosing gas with a coil and generating the plasma in high frequency, has come to be performed. In this plasma etching, an electrode plate is formed in homogeneity for the purpose of supplying reactant gas on the surface of a silicon wafer. As this electrode plate, the high grade aluminum which performed alumite processing, a graphite, quartz glass, etc. have been conventionally used for stainless steel and a front face.

EFFECT OF THE INVENTION

[Effect of the Invention] The electrode plate of this invention is good, polluting a silicon wafer twists it and the corrosion resistance over the plasma is extremely excellent.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, the plasma is easy to be corroded and stainless steel and the high grade aluminum which performed alumite processing to the front face have the fault which is easy to pollute a silicon wafer, and since a graphite is inferior to the corrosion resistance over the plasma, its life is short, and it does not bear it at prolonged use. Furthermore, quartz glass is difficult to process it, and it is comparatively expensive, and it has the fault to which use is limited by the class of corrosive gas. Without polluting a silicon wafer, this invention is equal to prolonged use, and aims at offering the electrode plate for plasma etching systems which moreover has versatility.

MEANS

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